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THE DELTA PI EPSILON JOURNAL

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HERBERT M. JELLEY

The 1958 Research Award: A Measurement and Interpretation of Money Management Understandings of Twelfth-Grade Students[1]

EDITOR'S NOTE: *The* DPE Journal *is pleased to present to its readers Dr. Herbert M. Jelley's prize winning study for 1958. In the editors' judgment the study furnishes an excellent model of a test-making process and an ingenious use of interview techniques for exploring learners' misunderstandings in the light of their test responses. In addition, notable care was used in data collection and analysis and commendable restraint exercised in drawing inferences from the data.*

Dr. Jelley earned his bachelor's degree at the University of Minnesota. He has been a high school and a college teacher and is presently Assistant Professor of Business Education at the University of Cincinnati.

For at least two decades there has been increasing awareness of the need for education aimed at improving consumer efficiencies. In keeping with this awareness, considerable research has been conducted to determine the topics which should be included in a program of personal-economic instruction. Few studies, however, have attempted to measure student understandings in these important topics. Accordingly, it was the purpose of this study to measure student mastery of facts and concepts in one phase of personal-economic efficiency. Insofar as the students in this investigation may be assumed to be typical of most students, the respects in which they appear to be weak may be those in which most are weak and which, therefore, probably require particular attention on the part of teachers.

Rather than dealing with all aspects of personal-economic education, it was believed that a more fruitful contribution could be made by focusing attention upon a narrower area, thus permitting a deeper probe into some important phase of this field. The aspect of personal-economic efficiency treated in this study is money management. The principle reason for limiting this investigation to money management is that virtually all of the studies of interests and opinions of educators, other adults, and students have shown financial management to rank exceedingly high in importance.

PURPOSE OF THE STUDY

The purpose of this study was to determine the money management understandings of second-semester high school seniors. The four major steps

[1]This report is a summary of a Doctor of Education thesis completed in 1958 at the University of Cincinnati under the direction of Dr. Harold R. Leith. The author wishes to express his appreciation for the many helpful suggestions given by Dr. Leonard J. West.

in the study were: (1) to isolate the topics dealing with money management which are of greatest importance; (2) to determine the extent of twelfth-grade students' understandings of these money management topics; (3) to determine whether differences in mastery are associated with differences in socio-economic status, academic achievement, and sex; and (4) to suggest how the evidence gathered can be used in curricular planning.

PROCEDURES

SUBJECTS

Permission was granted the investigator to administer a money management test to most of the seniors in two of the Cincinnati Public High Schools. In addition to these seniors, virtually all of the seniors in three Cincinnati suburban high schools were tested. At each school, the test was administered during regular class periods to classes made up entirely of seniors. An effort was made to interview from 15 to 20 percent of the individuals from each class who completed the test. Although scheduling difficulties made this impossible in some instances, the ratio of students interviewed to students tested was approximately equal for all five schools. Altogether, 603 students were tested and 102 students were interviewed. The testing was not restricted to seniors who were business majors or who had had a general business course, but included *all* seniors, regardless of particular academic background.

SELECTION OF TEST TOPICS

In order to identify the facts and concepts appropriate to a test in money management, a jury of qualified persons was selected. They were asked to rate in importance a list of topics originally secured by examining the content of eight consumer education and social business textbooks, published for secondary school use. On the assumption that the space which authors devote to any subject tends to vary with the importance of the subject, a word count was made of each money management topic discussed in the eight textbooks in an effort to identify the important topics. First an estimate was made of the total number of words devoted to money management in each textbook. Next, a count was made of the number of words devoted to each specific money management topic in each of the books. To facilitate comparisons among the eight books, the ratio which each specific topic bears to the whole discussion of money management in each book was expressed as a percentage. The topics were then ranked in order of importance on the basis of the average percentage for all eight books. That is, the topic within money management averaging the highest proportion of the total space devoted to money management was ranked first, and so on.

To check on the validity of using relative proportion of textbook space as an index of importance of topic, a jury was asked to rate each topic on a five-point scale; namely, Imperative, Very Important, Important, Desirable, or Unimportant. The jury consisted of the faculty sponsors of the chapters of Delta Pi Epsilon, a graduate honorary fraternity in business education. These sponsors are, in the main, the heads of business teacher education in colleges and universities offering graduate study in business education. Of the 28 such chapters, 26 of the sponsors returned the instruments.

The validity of the selection of topics around which to build test items is thus based on expert judgment: the judgment of textbook writers as inferred

from the space they devote to each topic — as checked independently by a jury of qualified persons. There was, almost inevitably, some overlap in these judges in that 3 of the 26 jurors were also authors of the textbooks examined.

By assigning weights of 4, 3, 2, 1, and 0 to the five steps on the rating scale, a weighted mean was computed for each of the 43 topics within money management discovered through textbook examination and presented to the jurors for rating. Thus, a topic such as "Automobile Insurance," with a weighted mean rating of 3.5 was checked as "Imperative" or as "Very Important" by most of the jurors; whereas the topic "Credit Insurance," with a weighted mean rating of 1.6, was most frequently designated as "Desirable." Topics and their weighted mean ratings are listed in rank order in Table 1.

TABLE 1

WEIGHTED MEAN RATING AND RANK POSITION OF 43 MONEY MANAGEMENT TOPICS BASED ON RATINGS BY 26 JUDGES[1]

	Topic	*Weighted Mean Rating*	*Rank*
1.	Need for insurance and how insurance operates	3.5	1.5
2.	Automobile insurance	3.5	1.5
3.	Social insurance — the social security program	3.4	3
4.	Computing finance charges	3.3	5
5.	Maintaining personal and family financial records	3.3	5
6.	Personal liability insurance	3.3	5
7.	Accident and health insurance	3.2	10.5
8.	Establishing and protecting a credit rating	3.2	10.5
9.	Sources and types of loans available to consumers	3.2	10.5
10.	Planning for saving money	3.2	10.5
11.	Types of life insurance contracts or policies — importance of selecting the right policy, settlement options	3.2	10.5
12.	Maintaining personal and family financial records	3.2	10.5
13.	Checking accounts — writing and transferring checks properly	3.2	10.5
14.	Need for life insurance — types of contracts, collection of premium payments	3.2	10.5
15.	Reasons for saving money — choicemaking involving future considerations	3.1	15.5
16.	Characteristics of charge accounts and their cost to the individual	3.1	15.5
17.	Characteristics of installment credit	3.0	17.5
18.	Fire insurance	3.0	17.5
19.	Making deposits in banks	2.9	19.5
20.	Withdrawing money from banks	2.9	19.5
21.	Need for investing money — differences between investing, gambling, and speculating	2.8	21
22.	Joint bank accounts	2.6	22.5

[1]The weights used are as follows: 4 = Imperative, 3 = Very Important, 2 = Important, 1 = Desirable, 0 = Unimportant.

TABLE 1 (Con't)

WEIGHTED MEAN RATING AND RANK POSITION OF 43 MONEY MANAGEMENT TOPICS BASED ON RATINGS BY 26 JUDGES

	Topic	*Weighted Mean Rating*	*Rank*
23.	Means of selecting a life insurance company and an insurance agent	2.6	22.5
24.	Safekeeping of savings	2.5	25.5
25.	Sources of information about investments	2.5	25.5
26.	Theft insurance (property)	2.5	25.5
27.	Means of sending cash by mail — registered letters	2.5	25.5
28.	Things to consider in selecting investments	2.3	28
29.	Investing in government securities	2.1	29
30.	Investing in real estate	2.0	32.5
31.	Regulation of insurance by government	2.0	32.5
32.	Other negotiable and non-negotiable instruments	2.0	32.5
33.	Investing in one's own business	2.0	32.5
34.	Financial and tax advice given by banks	2.0	32.5
35.	Legal limits of interest rates	2.0	32.5
36.	Investing in corporate securities	1.9	36.5
37.	Insurable interest	1.9	36.5
38.	Nonforfeiture values of a life insurance policy	1.8	38.5
39.	Assignment of insurance	1.8	38.5
40.	Incontestable clause in life insurance policies	1.7	40.5
41.	Safe-deposit boxes	1.7	40.5
42.	Credit insurance	1.6	42
43.	Compound interest — means of computing, cumulative power, how it differs from simple interest	1.4	43

The fact that the majority of the jurors rated most of the topics at or above the "Important" category, plus the fact that only one topic fell in the "Desirable" classification (while no topic was considered "Unimportant") attests to some extent to the validity of the list of topics derived from the textbooks. The jury's ratings were compared with the textbook list by computing a rank-difference correlation between the ratings and the textbook list. The textbook list was ranked by considering all eight textbooks as a group and obtaining a mean rank for each topic on the basis of proportion of space devoted to the topic. The correlation between the two lists is .58. In an absolute sense a correlation of this size is not notably high. If the space accorded to each topic in the textbooks were to be based on the judgments of the 26 jurors, there would be only modest agreement with the space actually devoted to the various topics in the eight books examined. The absence of substantial agreement does *not*, however, suggest that the jurors are more (or less) qualified to judge relative importance of topics than textbook writers. Instead, space allotment represents an imperfect — but the only convenient and readily available — first approximation to the estimation of importance. The jury rating as a basis for determining appropriate test content simply puts the validation of test topics on a broader (and yet more sensitive) basis.

PREPARATION OF MEASURING INSTRUMENT

The 17 topics whose weighted means exceeded 3.0 ("Important") in the rating procedure described in the previous section of this report were used to form the test plan. These 17 topics can be grouped under three broad areas of money management: (1) *borrowing money and using credit*, (2) *managing personal finances*, and (3) *insurance*. Using these 17 topics as a test plan, 60 objective-type test items were written. While the jury rating was used to validate test *topics*, the question of whether any particular test *item* is a valid measure of mastery of some particular topic was not thus determined. Face validity is claimed for the test items.

Because the money management test was the criterion on which all the purposes of this study rested, versions of the test went through successive revisions and refinement aimed at maximizing the reliability of the instrument and at improving the discriminating power of the test items. Items which lacked discriminating power because they were uniformly too easy or too difficult were discarded or rewritten. Following a pre-final administration of the revised test to 83 seniors in one Cincinnati parochial high school, item analysis established that every item in the test discriminated significantly. That is, those who got any particular item correct tended to have a high total test score; whereas, those who got any given item wrong tended to be among those with low total test scores.[2] For example, there were no items so constituted (by way of wording or subtle distinctions among the options) as to "trick" the high total test scorer into a wrong answer (because he knows too much) — while at the same time permitting the low total test scorer to get the item correct simply because he does not know enough to be fooled by a too-subtle distinction or possibly ambiguous wording built into the question.

Another reflection of the discriminating power of the test must be viewed in light of the fact that maximum discrimination is known to arise from test items at (or averaging at) the 50 percent level of difficulty (i.e., half the examinees get any given item correct). The mean difficulty level of the three subsections of the test ranged from 59.3 to 82.7 percent and averaged, for the test as a whole, 68.4 percent. Number correct on the 60 item test ranged from 26 to 51. Thus, the test is rather more difficult than those teachers customarily give. But, by the same token, tests characteristically given by teachers are notably deficient in discriminating power; they tend to generate too narrow a range of scores bunched around an average score which is too high.

With respect to test reliability (the extent to which the test furnishes an accurate and precise measure of whatever it does measure) the internal consistency of the test items was estimated, using Kuder-Richardson Formula No. 20. This form of reliability measures the extent to which the items in the test measure the same factor or function (e.g., knowledge of life insurance, of money and credit, or managing one's personal finances.).[3]

[2]The relevant statistic is the Phi Coefficient, which is essentially a product-moment coefficient of correlation measuring the extent to which getting a given test item correct is accompanied by getting a high total test score. All 60 of the test items were found to discriminate at the one percent level of confidence. That is, the relationship between status on any item (correct versus incorrect) and status on the test as a whole (high versus low total score) is such as could occur by chance in less than one out of one hundred such samples if the true relationship were indeed zero.

[3]If, for example, two test items measure different things, then they cannot be taken to furnish a reliable measure of any one thing. On the other hand, the greater the extent to which a number of different test items measure the same thing, the more reliably they measure that thing. Kuder-Richardson Formula No. 20, which furnishes this index, may be found in most tests and measurements textbooks.

The final form of the test consisted of sixty 4-option multiple choice items: 17 items on borrowing money and using credit, 18 items on managing personal finances, and 25 items on insurance. Each correct answer was allotted one point; the maximum possible score on the test was 60 points. The descriptive statistics for this test, based on the pre-final administration to 83 parochial students, are shown in Table 2. In interpreting the reliability coefficients shown in the table consider an illustration of a reliability coefficient of .80. If on the first administration of the test individual A scored at the 75th percentile (25th from the top in a group of 100) while individual B scored at the 25th percentile, then on a second administration of the test there is about one chance in five that individual B would surpass individual A. With a reliability coefficient of .90, there is one chance in twelve that B would surpass A on a second administration.

TABLE 2

MEAN, STANDARD DEVIATION, AND RELIABILITY OF EACH OF THREE SECTIONS OF A MONEY MANAGEMENT TEST ADMINISTERED ON A TRIAL BASIS TO 83 HIGH SCHOOL SENIORS

Test Section	*Number of Test Items*	*Mean*	*Standard Deviation*	*Internal-Consistency Reliability*
Borrowing Money and Using Credit	17	9.84	2.04	.82
Managing Personal Finances	18	13.92	2.56	.91
Insurance	25	14.96	3.07	.82
Total Test	60	38.72	8.59	.87

As a final step in determining whether the test is free of contamination by irrelevant variables — for example, that it is not to too great an extent a measure of reading ability — its "readability" was checked. Two readability formulas indicate that the reading level of the test is at about the seventh grade level, which is well below the reading level of the students to whom the test was administered. In addition, through the use of partial correlation, scores on the money management test were correlated with reading test scores, while removing the effects of differences in intelligence. The resulting partial correlation of .29 means that about nine percent ($.29^2$) of the variability in scores on the money management test is associated with differences in reading ability on the part of the examinees.

The test plan also served as a basis for the construction of an interview guide.

DETERMINING SOCIO-ECONOMIC STATUS OF STUDENTS

In order to determine whether or not significant differences exist in the money management understandings of students who differ in socio-economic status, the Minnesota Scale for Paternal Occupations was used to assign a socio-economic classification for each student. Several methods were used to discover paternal occupations, but the two principal means used

were school records and a statement written by the student on the reverse side of the test answer sheet.

DETERMING ACADEMIC ACHIEVEMENT OF STUDENTS

The students who participated in this study were divided into three groups according to scholastic grades during their last three years in high school. For each school, the investigator simply arranged the grade-averages in order from highest to lowest. From this array of averages, the top third were placed in the "upper" group and the middle and bottom thirds were placed in the "middle" and "lower" groups, respectively.

RESULTS

EXTENT OF UNDERSTANDINGS IN TOPICS MEASURED

Table 3 presents the percentage of correct responses to the test items measuring understandings in each of the topics comprising the money management test. In the paragraphs which follow, certain test items and interview questions are discussed. These items have been selected because they illustrate certain strengths or weaknesses. That is, they are items which were missed either more frequently or less frequently than other items in the test.

BORROWING MONEY AND USING CREDIT

As Table 3 indicates, about half the test items dealing with loans, installment credit, and the computation of finance charges were answered correctly. Here is an illustrative item.

> After making a down payment on a refrigerator, you still owe $230. The $230 will be paid off in 12 monthly payments of $20 each. What is the true annual interest on the amount financed?
>
> A. About 6 percent
> B. About 8 percent
> C. About 12 percent
> D. About 16 percent

The question was designed to discover whether students understood the concept "true annual interest rate." In this test item, the interest cost amounted to $10. Ten dollars is about 4 percent of $230, the amount borrowed. However, because the principal will be paid back periodically during the year, the true annual interest rate is about twice what it would be were the money to have been borrowed for the whole year. Thus, the true interest rate in this case is about 8 percent. Fewer than a third of the students answered this item correctly.

TABLE 3

PER CENT CORRECT RESPONSES TO MONEY MANAGEMENT TEST ITEMS

Topic	*No. of Test Items*	*Per Cent Correct Responses*	*Mean Number Correct*
I. *Borrowing Money and Using Credit*			
Establishing and Protecting a Credit Rating	4	77.5	

TABLE 3 (Cont'd)

PER CENT CORRECT RESPONSES TO MONEY MANAGEMENT TEST ITEMS

Topic	*No. of Test Items*	*Per Cent Correct Responses*	*Mean Number Correct*
Characteristics of Charge Accounts and Their Cost to the Individual	3	67.6	
Sources and Types of Loans Available to Consumers	4	53.7	
Characteristics of Installment Credit	3	47.7	
Computing Finance Charges	3	45.7	
Summary, Section I	17	59.3	10.06
II. *Managing Personal Finances*			
Reasons for Saving Money — Choice-making Involving Future Considerations	3	86.3	
Maintaining Personal and Family Financial Records	3	86.1	
Maintaining Personal and Family Budgets	3	83.1	
Checking Accounts — Writing and Transferring Checks Properly	6	81.0	
Planning for Saving Money	3	78.3	
Summary, Section II	18	82.7	14.89
III. *Insurance*			
Need for Insurance and How It Operates	4	79.3	
Social Insurance — The Social Security Program	4	78.0	
Accident and Health Insurance	4	72.3	
Personal Liability Insurance	1	63.0	
Automobile Insurance	4	62.2	
Types of Life Insurance Contracts or Policies — Importance of Selecting the Right Policy, Settlement Options	4	51.5	
Need for Life Insurance — Types of Companies, Collection of Premium Payments	4	42.5	
Summary, Section III	25	64.2	16.06
Summary, Entire Test	60	68.4	41.01

An interview question directed at 102 of the students who took the test was designed to elicit essentially the same information. The question asked was: "When you buy something on time, and the store tells you the amount

of the finance charge in dollars (such as $12), do you know how to figure out the percent of annual interest you are paying?" Most of the students replied "No," or "I don't think so." Forty-one students, however, said that they thought they could figure the annual interest rate. It is significant that only about half of the students who thought they could figure the percent of annual interest could explain the procedure they would use. The interviewer considered 19 of the explanations satisfactory.

A comparison was made of the results obtained on this part of the interview with the performance of these same 102 students on the test item which measured interest computation. Fourteen students answered the test item correctly and also showed in the interview that they know how to figure the interest on the problem given; five students indicated in the interview that they knew how to solve the problem, but they missed the test item; twelve students answered the test item correctly but missed the interview question (indicating that on the test they guessed the right answer — only about half as many as should have been expected to guess the right answer on the basis of chance alone); and seventy-one missed both the interview question and the test item. Using these data, the test results and the interview results were correlated by means of a tetrachoric *r*, which gives a coefficient that is numerically equivalent to a Pearson *r*. The correlation coefficient for these two variables is .81. Thus, a relationship exists between the results of the interviews and this test item.[4]

A question which measured understanding in the area of establishing and protecting a credit rating presented some interesting insights into a misconception held by many students. The stem of the test item is as follows: "When you move to a new city, you may want to charge things at stores, or borrow money from a bank or a loan company. But the people in this new city do not know whether or not you pay your bills. What is the best thing to do to show them that you do pay bills?" Although this question was answered correctly by a majority of the students, it is significant that the most attractive mislead for the students, and therefore the most common misconception of those who did not select the correct answer, was "At first, pay cash for everything you buy."

MANAGING PERSONAL FINANCES

Student understandings were at a uniformly high level on each of the five topics which made up the section of the test which dealt with the management of personal finances. The percentage of correct responses on this section of the test was considerably higher than on the other two test sections.

One of the questions in this section of the test was designed to discover which of four plans for saving money is most advantageous. For most people, the most effective means to save money consistently is to decide in advance upon a certain amount of money which can be set aside periodically. This amount then becomes a fixed deduction from income; it is not considered money which is available for spending. An overwhelming majority of the students tested agreed with this principle.

The 102 students who were interviewed were asked the question, "If you were to make out a budget (a plan of how you are going to spend your money), how would you decide what to put in the budget?" About half of

[4]The results of eight interview questions were correlated with the results of comparable test items by means of Ftetra. These correlation coefficients ranged from .62 to .84. The mean co-efficient is .76.

the students thought that budgets should be constructed after first considering past expenditures. Another one third of the students mentioned that when constructing a budget, the best procedure to follow is to record first all necessary expenditures. After this has been done, according to these students, other items can be listed in order of need or preference until the available income has been used. About ten percent of the students advocated consulting books on budgeting.

The other interview questions corroborated the findings of the test items which measured understandings in the area of managing personal finances. That is, student understandings were at a relatively high level.

INSURANCE

As Table 3 indicates, student understandings varied considerably among the topics which comprised the section of the test dealing with insurance.

The test item which follows was designed to discover whether students were familiar with the necessity of spreading risk among large numbers of people and over large areas.

> Eight men get together and decide to stop paying money to insurance companies for fire insurance on their homes. Instead, they agree to pay the money into a fund of their own. Then, if there is a fire in one of their houses, the money in the fund will be paid to the owner. Which of the following is the best statement about this plan?
>
> A. The risk of loss because of fire is not spread enough.
>
> B. The eight men have learned a great deal about economic law.
>
> C. The eight men will save a great deal of money over several years.
>
> D. The idea is sound if the men want business experience, but they should not expect to save much money.

Fewer than 60 percent of the students selected the correct response to this item. Almost half of the students were not aware of the insurance principle represented by option A. The choices of most of the students who missed this item were evenly divided between options C and D.

A similar question was directed to the students interviewed, as follows: "Some think it would be wise to stop paying money to insurance companies and instead save the money that would otherwise be paid to the companies. Then in emergencies, one could just go to his savings account. Do you think this is a good idea?" Just two persons agreed that this plan would be feasible. When asked why they favored this plan, both of them said that the plan would enable one to save money on insurance costs. Fifty-eight of the 100 students who did not favor this plan suggested that an emergency might require more money than had been saved. One-fourth of the 100 students thought the best reason for rejecting this plan is that a temptation exists to spend the money saved for another purpose. Only four students pointed out that insurance companies are able to spread the risk.

The test and the interviews revealed that student understandings were lowest in the area of life insurance. The majority of students showed little

knowledge of the purposes and plans of the various types of life insurance contracts issued by insurance companies. The question which follows is typical of the questions asked in this section of the test.

> A 25-year-old man is married and has two children under five years of age. Because he is just starting out on his job, his income is very small. He has no life insurance on himself. He can spend very little money on life insurance. Which of the following types of life insurance would be best for him?
>
> A. A policy which would be paid up by the time he is 45 years old.
>
> B. A policy which would pay him a lump sum in cash at the end of 20 years.
>
> C. A policy which would protect him for 10 years, and which would have no cash value at the end of 10 years.
>
> D. A policy which would enable his children to get a lump sum in cash when they are 10 years old.

Slightly fewer than 50 percent of the examinees selected the correct alternative (c), which describes term insurance. Student understandings were equally low on questions which measured understandings of other life insurance situations.

The interview results shed more light on the students' lack of knowledge of life insurance provisions. The following description of a life insurance policy was given to the interviewees: "It is possible to buy a type of life insurance policy which does not build up a cash value (there is no savings feature to the policy). You buy it for a certain period of time, and if you die within that time, your beneficiaries collect; otherwise, if you do not die within the period, nobody collects." Then the students were asked: "Do you think this insurance should be bought by anyone? Who should buy it and under what circumstances?" Forty-one students replied that they did not think anyone should buy the type of insurance described. Another 11 persons could not decide whether or not this insurance merited purchasing by anyone. About one-fourth of the 46 students who favored this type of insurance thought that it should be bought by persons engaged in dangerous occupations. Another one-fourth of the students favoring this plan thought this insurance should be bought by elderly persons or by those who, because of illness, have a limited life expectancy. Possibly the greatest insight was evidenced by 13 students who replied that term insurance should be purchased by persons who need more life insurance than they could afford to purchase with any other type of insurance policy. These students were aware of the importance of protecting dependents by adequately insuring the life of the family breadwinner. They were also cognizant of the low cost of term life insurance. Six students replied that everyone should buy this type of insurance because it is cheaper than other kinds. All six of these students erroneously assumed that term insurance could be renewed indefinitely and for the same premium rate. Three students mentioned a common use of term life insurance — that of insuring one's life while a major debt is outstanding, for example, a mortgage on one's home.

COMPARISON BY SOCIO-ECONOMIC STATUS

The 603 students tested were divided into socio-economic classes as follows: lower class, 115 students; middle class, 366 students; upper class, 122 students. The mean score of each of the three socio-economic groups on each of the three sections of the test is shown in Table 4. Differences in means which are significant at at least the .05 level (by t test) are described in the footnote to the table.

TABLE 4

MEAN SCORE OF THREE SOCIO-ECONOMIC GROUPS ON EACH OF THREE TEST SECTIONS[1]

Test Section	*No. of Test Items*	*Upper Socio-Economic Group*	*Middle Socio-Economic Group*	*Lower Socio-Economic Group*
Borrowing Money and Using Credit	17	10.57	10.09	9.40
Managing Personal Finances	18	15.35	14.93	14.30
Insurance	25	17.48	15.96	14.86
Total Test	60	43.40	40.98	38.56

It may be noted that although most of the differences between the various groups are too large to be attributable to chance (in a sample of 603 persons), most of them are rather small in an absolute sense. Except for "Insurance" knowledge, differences in mean scores are on the order of about one point. In any event, the implications of such differences as have been demonstrated are discussed in a subsequent section of this report.

OTHER COMPARISONS

On all three sections of the test, it was found that the students who comprised the higher academic achievement group scored significantly higher than the students who made up the middle group. Likewise, on all three sections of the test, the students comprising the middle achievement group scored significantly higher than the students who comprised the lower group. All of these comparisons revealed differences which were well beyond the .01 level of confidence. The mean scores are shown in Table 5.

TABLE 5

MEAN SCORE OF THREE ACADEMIC ACHIEVEMENT GROUPS ON EACH OF THREE TEST SECTIONS

Test Section	*No. of Test Items*	*Higher Academic Group*	*Middle Academic Group*	*Lower Academic Group*
Borrowing Money and Using Credit	17	11.15	10.23	8.80
Managing Personal Finances	18	15.75	14.93	13.99
Insurance	25	17.74	16.53	13.91
Total Test	60	44.64	41.69	36.70

[1]The mean scores of the "Lower" group are significantly inferior to the mean scores of each of the other two groups on all three sections of the test. In addition, the "Middle" group is significantly inferior to the "Upper" group on the "Money and Credit" and "Insurance" sections of the test (but not on the "Managing Personal Finances" section).

The final comparison of test scores made was between male and female students. On the two sections of the test which measured borrowing money and using credit and managing personal finances, female students scored slightly higher as a group; but the differences in both instances failed slightly to be significant at the .05 level of confidence. On the other hand, males scored significantly higher than females on the section of the test which measured insurance understandings. These mean scores were: male students, 16.33; female students, 15.79.

The implications of the findings on socio-economic status and on academic achievement are discussed in the section which follows.

DISCUSSION

The understandings, or lack of understandings, of students have certain implications for teachers and others interested in curriculum improvement. These implications are discussed in the following paragraphs. Then, some inferences are drawn from the differences in understandings which exist among various sub-groups of students. The fact that many students are unaware of some of their weaknesses is then discussed. Finally, some comments are made about the interest which the test items engendered among students.

BORROWING MONEY AND USING CREDIT

Both the test results and the interview results indicate that the second-semester seniors who participated in this study could have profited by more instruction in a number of topics dealing with borrowing money and using credit. The topic on which the students showed least understanding was "Computing Finance Charges." Fewer than half the test items on this concept were answered correctly. The interview responses corroborated these findings. Since many authorities on consumer education advocate that personal-economic instruction be taught by "infiltration" into other existing courses, it seems apparent that this topic could well receive more emphasis in mathematics courses.

Another topic on which students showed deficient knowledge was "Characteristics of Installment Credit." Again, fewer than half of the test items which measured understandings in this area were answered correctly.

MANAGING PERSONAL FINANCES

One of the most revealing discoveries of this study was that both on the test and in the interviews, students possessed considerable understanding in the area of managing personal finances.

Five topics comprised the test plan for the section of the test concerned with managing personal finances. These five topics dealt with maintaining records, maintaining budgets, reasons for saving money, plans for saving money, and checking accounts. On all of the foregoing topics, the students showed much more understanding than they did on other sections of the test. From about 80 to 90 per cent of the test items on these topics were answered correctly by most students.

It is significant that in virtually all the reports and studies reviewed in preparation for the present study, stress was placed on the importance of teaching students how to maintain budgets and to keep simple household records. The Consumer Education Study, for example, outlined five criteria that any program of consumer education must meet. One of these five cri-

teria was competence in financial management; and, in discussing this criteria, budgeting and keeping records were cited as being of paramount importance. All of the topics which comprise this section of the test also ranked high among the topics evaluated by the 26 judges. Thus, it is especially gratifying that most of the seniors who participated in this study possess kowledge which will help them to manage their personal finances.

INSURANCE

The least understanding possessed by the students in this study was in the two life insurance topics included in the test. One of the topics dealt with premium collections and types of companies; the other topic concerned life insurance contracts or policies. The interview results on insurance topics were similar to the test results: students displayed a lack of knowledge of life insurance. The fact that understandings were so low in these topics is of significance, because the rating procedure described previously resulted in these two topics being ranked quite high among the 43 topics. It is possible to conclude, therefore, that life insurance topics had been neglected in the learning experiences of the students who participated in this study.

This study has focused attention on the several areas of money management in which the seniors showed lack of adequate understanding. The need is to find a way to make these topics part of the learning experience of each student. The business department, the mathematics department, and the social studies department can doubtless contribute most to the money-management phase of personal-economic education. Where enrollment in a business course is limited to business students, the school should make certain that these topics are included in a part of the curriculum which will enable all students to include them in their learning experiences.

IMPLICATIONS OF DIFFERENCES AMONG CERTAIN GROUPS

It is possible to generalize from this study that the money management understandings of students from the upper socio-economic class are greater than the money management understandings of the other students. Furthermore, the money management understandings of students from the lower socio-economic class are lower than the money management understandings of the other students.

The fact that students from the lower socio-economic group understand the least about money management is especially significant because these are the citizens who have least financial margin for error. If they are to be reasonably well fed, clothed, and housed, they can ill afford financial losses resulting from poor financial management. These are the persons most likely to be the focus of exploitation by unethical vendors. Thus, a special case can be made for educating this group for wise and efficient money management. Curriculum workers should be especially cognizant of the need for giving those in the lower socio-economic classes ample opportunity to engage in experiences which will help them to become efficient managers of their money.

On the basis of the findings of this study, the generalization can also be made that the higher the degree of academic achievement of a group of students, the greater will be the money management understandings of that group. This finding is not, of course, surprising — higher achievers in general tend to be higher achievers in particular. However, the fact that low

achievers understand less about money management is significant. Many of these students lack the poise, confidence, and mental acumen of the students whose achievement has been higher; thus they can be more easily exploited. In addition, these are the people who, lacking capacity for higher-order abstraction, will learn something of economics only through a direct and practical approach to personal-economic problems.

There is, perhaps, substantial overlap in membership in a socio-economic group and in the parallel achievement group. That is, more of the low achievers may be in the low socio-economic group than in either or both of the other two socio-economic groups. Accordingly, it is proper to point out that the findings of this study with respect to socio-economic status and to academic achievement are *not* independent. That is, measures of persons who differ in socio-economic status and in academic achievement may be, to some extent at least, measures of the same persons differently categorized.

MANY STUDENTS ARE UNAWARE OF THEIR MISCONCEPTIONS

The interviews with students revealed that many of them are unaware of their deficiencies in the area of personal-economic efficiency. Many of the students interviewed missed as many as a third of the sixty test items. Yet, these same students expressed the opinion that the test was not too difficult; and they estimated that they missed "six or seven" test items. Many of the students were quite sure that they had given the correct answers to "almost all" of the insurance items — the section on which students did most poorly.

INTEREST IN TEST ITEMS

One of the most revealing discoveries made during this investigation was the interest which the test items engendered among many of the students. After every administration of the test, invariably students would crowd around the investigator and ask questions stimulated by the test items. Frequently during the interviews, the students, having recognized that the interviewer was also the test administrator, would comment on certain items in the test and ask questions concerning the alternative answers given to the test items. This indicates that a test of this type should be valuable as an initiatory activity to introduce study in the area of money management.

SUMMARY

This study measured the mastery of money management facts and concepts of 603 second-semester high school seniors in five Cincinnati high schools. A 60-item multiple choice test and an accompanying interview guide, constructed to measure these understandings, covered the three major areas of: borrowing money and using credit, managing personal finances, and insurance.

Both the test results and the interview results indicate that the seniors who participated in this study could have profited by more instruction in a number of topics dealing with borrowing money and using credit. Student understandings of "Computing Finance Charges" were particularly low. Other topics dealing with borrowing money and using credit on which understandings were low are: "Characteristics of Installment Credit" and "Sources and Types of Loans Available to Consumers." Understanding of "Life Insurance" topics also were quite low. On the other hand, students showed

evidence of possessing considerable understanding of "Managing Personal Finances."

On each section of the test, statistical comparisons were made among the test scores of students who differed in socio-economic status, academic achievement, and sex. In general, this study revealed that in most money management areas, students from the upper socio-economic groups and the higher academic achievement groups possess the greatest understandings. These findings suggest that lower achievers and those from lower socio-economic groups be given special attention to reduce the chances of their being exploited by unethical and unscrupulous vendors.

THE NEW EDITORS

Dr. Leonard West remains associated with us, concentrating on research manuscripts. Unfortunately, Dr. Earl Dvorak, one of the original JOURNAL staff, resigned due to the press of other professional obligations; we express our gratitude for his time, energies, and critical reflection upon the policies that led to the permanent authorization of the JOURNAL.

From time to time other individuals will serve as editorial consultants on a given manuscript; they will be identified and credited by documentation.

With this issue, the work of two new associates begins. Their professional background appears below.

OLIVERIO, MARY ELLEN

Education: A.B., B.S., 1947, Fairmont (West Virginia) State College; M.A., 1949, Columbia University; Ph.D., 1954, Columbia University.

Experience: 1947-1948, Tchr., Fairview (West Virginia) H.S.; 1949-51, Instr., Bus. Adm., Marshall College; 1954- Assoc. Prof. of Business Education, Teachers College, Columbia University; prior secretarial experience.

Publications: numerous articles in business education journals; editorship; President, UBEA Research Foundation.

HIMSTREET, WILLIAM C.

Education: A.B., 1947 San Jose (Calif.) State College; M.A., 1950, Stanford University; Ed.D., 1955, University of Southern California.

Experience: 1941-42, 1946, Office Mgr., Union Pacific R.R.; 1949-52, Tchr., Petaluma (Calif.) H.S.; 1949-42, Asst. Prof., Humboldt (Calif.) State College; 1952- Assoc. Prof. and Chrm., Dept. of Bus. Ed. and Bus. Comm., University of Southern California.

Publications: two books, several monographs, articles in business education journals, two editorships.

LEONARD J. WEST[1]

Some Relationships Between Straight-Copy Typing Skill and Performance on Job-Type Activities

(EDITOR'S NOTE: *Professor West is this journal's associate editor for research. Therefore, in accordance with editorial policy, his manuscript was handled as that of any other contributor — it was reviewed by a consultant in educational research and edited by another associate editor.*)

The ultimate objective of vocational typing courses is the development of a marketable level of skill on job-type activities. To that end, training programs and the practice materials in typing textbooks normally include such activities as the preparation of correspondence, tables, memos, and the like. Ordinarily, however, the development of increasingly higher levels of straight-copy proficiency goes on throughout the course of training. The assumption is presumably that high levels of stroking skill make a significant contribution to performance on job-type activities. If this is a valid assumption, then devoting substantial amounts of training time to sheer stroking skill is justifiable. If the assumption is not valid, then spending large amounts of training time on building straight copy proficiency would appear to be of questionable merit. The question becomes one of the degree to which proficiency at straight copy work and at job-type activities go hand in hand.

What is the relationship between straight copy performance and performance on job-type activities? This article reports data on that question.

EVIDENCE FROM EARLIER STUDIES

A number of earlier studies on this topic have been briefly mentioned in the writer's comprehensive and large-scale *Review of Research in Typewriting Learning* (West, 1957b), while Crawford, in his recent dissertation (Crawford, 1956), has discussed these earlier studies in more detail. The general trend of the findings calls into question any marked correspondence between straight copy skill and proficiency at job-type activities — but not in a form which furnishes a direct and uncontaminated answer to the basic question. Crawford, for example, has demonstrated that those

[1]I wish to express my gratitude to Mrs. Margaret Rewerts, at the time a freshman student at Southern Illinois University and my part-time secretary, who spent dozens of hours computing hundreds of correlation coefficients, some of which appear in this report.

who spend all their training time at production typing do better at production typing than those who spend two-thirds of their time at straight skill building and one-third at production typing. Other studies report proficiency at various job-type activities as a percentage of proficiency at straight copy work (e.g., Martin, 1954; Penar, 1953).

In any event, the issue here is not one of the effect of different training methods on production typing or of expected production proficiency as a function of straight copy proficiency. Instead, this investigation raises the straightforward question of whether, *within a group with comparable training and experience*, those with higher straight copy skills do better at job-type activities. Accordingly, the data are in the form of correlations between performance scores for straight copy work and those for job-type activities.

INTERPRETING CORRELATION COEFFICIENTS

How much of a contribution does sheer stroking power make to performance at job-type activities? The answer is: it depends on the degree to which sheer stroking skill is an important component of some job-type activity. To put it another way: it depends on the degree to which straight copy performance and the components of a real job (whatever they may be) are based on the same factors. It is this latter answer which is pertinent; for correlation coefficients may be taken to measure the degree of agreement between the factors that underlie the two things correlated — in this instance, the two kinds of performances. If increases in scores on one kind of performance are markedly accompanied by increases in scores on the other performance, we have a high positive correlation and we infer that the factors that underlie straight copy proficiency have much in common with those that underlie skill at job-type activities. If the correlation is low, then there is little overlap between the factors, and the two performances are presumed o rest mainly on different factors.

Correlation coefficients range from —1.00 through zero to + 1.00. Zero indicates absence of relationship, while higher values, in either direction from zero, denote progressively larger amounts of relationship. For example, the characteristically near-zero relationship between speed and errors in straight copy work for those at intermediate levels of skill suggests that the factors that account for fast stroking are different from those that bring about accurate stroking — a finding which suggests that any attempt to build stroking speed and reduce errors at the same time will meet with limited, if any, success. The two features of performance are apparently based on different underlying factors.

Perfect relationships are not uncommon in the physical world; for example, altitude above sea level and density of the air show perfect negative correlation (—1.00); while the pressure and temperature of a gas show perfect positive correlation (+ 1.00). Perfect relationships are virtually nonexistent for aspects of voluntary human behavior, however, and correlations like —.35 or + .76 (denoting less-than-perfect relationships) are characteristic.

The chief point about interpreting correlation coefficients of the type employed in this investigation (produce-moment coefficient of correlation, designated by r) is that you square the value for r to determine what proportion of factors is common to two performances. For example, if number of errors on two consecutive tests is correlated to the extent of r = .4, then 16

per cent ($.4^2$) of the factors that determined the number of errors on the first test were also operating during the second test; 84 per cent of the factors were different on the two tests. As a bench mark to hold in mind, an r must be .71 before even half the factors that make up one sort of performance may also be said to be present in some other performance ($.71^2 = 50.4$ per cent).

In short, to interpret an r, we square it. Thus an r of .6 is nine, not three, times as high as one of .2 ($r^2 = .36$ and .04, respectively). The square of the r's shown in this report denote the degree to which the factors that account for straight copy proficiency are the same as those that account for skill at job-type activities.

PROCEDURES

SUBJECTS

The examinees were college students in three different typing classes taught by the writer during the past year: two Typing III classes (with registrations of 15 and 23, respectively), and one Typing IV class with a registration of 28. Each class met for four 50-minute periods weekly during a 12-week quarter. Those in Typing III classes had typically had one year of earlier high school typing training, while Typing IV students typically had one and one half to two years of earlier high school training. The students were all either secretarial or business education majors.

INSTRUCTIONAL CONTENT

The content of earlier high school typing experience is not known. With respect to collegiate instruction, Typing III classes spent at least 80 per cent of all class time on job-type activities, while Typing IV classes devoted at least 90 per cent of their time to such activities.

TEST CONTENT AND ADMINISTRATION

Since straight-copy proficiency was the base against which performance on job-type activities was to be related, the demands of reliability suggested a substantial sample of straight-copy work — especially because of the characteristically wide fluctuations in number of errors made in such work. Accordingly, two 10-minute timings were administered on new copy, each at 1.40 syllabic intensity. These were administered on the same day, but in counterbalanced order (half of each class taking the timings in 1-2 order; the other half, in 2-1 order). This was done in order to remove as a potential source of irrelevant variance any interaction between fatigue factors and possible differences in copy difficulty.

The job-type activities were incorporated in a 2-hour final examination given several days after the straight-copy timings. The examination consisted of (a) 30-minutes'-worth of ordinary business correspondence with envelopes, (b) a letter containing a 3-column listing with column headings, (c) a 1-page manuscript with footnotes, (d) an unarranged table, and (e) typing from rough draft copy containing several errors not marked as such in the original copy. One carbon copy was made of all work. While the five types of test content were the same for both Typing III and Typing IV classes, the items chosen for the Typing IV class were more difficult (e.g., the letter with the listing had a middle column in which each item consisted

of from one to two lines of full-sentence prose).[2] Because most of the students were prospective teachers of typewriting, for whom it would appear appropriate to set high standards, most of the test items were more difficult than any to be found in available college typing textbooks. All students in all classes did their own planning from the unarranged test copy and were directed to erase and correct any errors they might make on all parts of the final examination. However, in order to preserve as the basis for comparison the manner in which straight copy work is ordinarily scored, there was no erasing of errors in the straight copy timings given earlier.

Each item or sub-section of the final examination was, in effect, run as a separate, self-contained test. Except for the half-hour of letter typing, each student brought his paper to the front upon completion, and completion time was recorded to the nearest quarter-minute. Students finishing early simply waited until all had finished, at which time all started together on the next itenf. In contradistinction to Crawford's study, in which the scoring was for one 2-hour "package," the present procedure allowed for the assessment of relationships between straight copy performance and *each* of various job-type activities separately — thus revealing whether the various job-type activities make varying demands on straight copy skill. In addition, since the procedure permitted correlating the job-type activities against each other, it furnished a basis for determining (a) whether the various job-type activities have much in common and, accordingly, (b) whether separate training and practice is needed for each of the job-type activities.

TEST SCORING

Straight copy timings were scored for gross words per minute and for total errors in twenty minutes. On the business correspondence test, thirty minutes were allowed, and more letters were assigned than could be finished in that time. Accordingly, each person's work was scored separately for gross wpm — by dividing total words typed by 30 — and for quality, utilizing an arbitrary set of penalties for various sorts of errors. All the other job-type activities were scored for speed in terms of completion time,[3] and separately for quality in the same manner as for the business correspondence.

With respect to scoring for quality, Crawford's procedure of accepting only "mailable" work (in the sense of scoring only for acceptable work) is easily the most realistic one and avoids the difficulties inherent in using an arbitrary set of penalties for various errors. On the other hand, it is important to grasp that scoring only for acceptable work does not furnish a "pure" measure of speed. The relationship between speed and quality is not known, and only separate and pure measures of each of these two aspects of performance could furnish data on the question. Accordingly, the measure of

[2]While the figures are of not much descriptive value in the absence of the actual problems, perhaps some idea of the scope of the test items may be inferred from the fastest, slowest, and median completion times (in minutes) for each of the items: Letter with tabulation — 8¾, 14¾, 12¾; Tabulation — 9½, 17¼, 13; Rough Draft — 6¼, 12¼, 10¼; Manuscript — 10¾, 17¼, 14½. These data are for the Typing III classes.

[3]Time scores for completed work were used — rather than wpm scores for amount of work done in a fixed time — because under the latter conditions (a) some would have finished before time was up, so that their work could not have been scored accurately for speed, and (b) some would not have finished in the time allowed, and there is no way to score incomplete work for quality. In any event, for the purposes of reporting the present data the sign of the resulting correlation has been reversed in certain instances to facilitate and make uniform the interpretation of data. For example, high straight-copy speed going together with a smaller number of minutes to complete a job produces a negative correlation. Changing the sign of the resulting correlation from minus to plus is simply a reporting convenience to show that speed goes with speed.

speed used in this investigation includes every stroke put on the paper — good, bad or indifferent. The use of a penalty system for errors is similarly called for.

In any event, provided there is a consensus that errors in form and arrangement are more serious than simple misstrokes (with penalties assessed accordingly), the use of an arbitrary set of penalties uniformly applied to all test papers should not have any material biasing effect on the size of the resulting correlations. Students were thoroughly accustomed to working under speeded conditions and were acquainted with the scoring system used. Although there were, no doubt, some who would have done work of better quality had they not pushed too hard for speed, any assessment of job proficiency which does not take speed of work into account is manifestly invalid.[4]

RESULTS

FINDINGS ABOUT STRAIGHT COPY PERFORMANCE

Gross speed on two consecutive 10-minute timings correlated typically in the mid-.80's to mid-.90's. Number of errors correlated typically about .40. The error correlation is, in an absolute sense, so low — even on the basis of two 10-minute samples of performance — that it is clear that the one or two 5-minute timings characteristic of typing instruction are nearly useless as reliable indices of straight copy accuracy. Further, when evaluation is based on the better of two (or more) tries, either on the same or on different test copy, the last vestiges of reliability vanish. Under such conditions any presumption of having a dependable measure of a person's typing accuracy is just that — presumptuous! For measures of speed, on the other hand, quite good reliabilities are achieved for timings as short as two or three minutes. In fact, gross speed on a 5-minute timing administered before any instruction whatever in a beginning class — students using entirely hunt and peck techniques — correlated with gross speed on the same copy twelve weeks later to the extent of $r = .63$. After only four days of instruction, speed correlated .85 with final speed. *Speed of performance measured at any time is apparently a very good index of speed measured at any other time. On the other hand, measures of errors are too unstable for any discernible predictive use.*

Net word per minute scores are notably less stable than gross speed scores (especially at low levels of skill); and they are more reliable than error scores at advanced levels of speed only because gross speed is so large a component of net speed.

The data so far described are quite in accord with those from earlier studies and show rather clearly that *gross stroking speed is the only measure of straight copy proficiency with genuine stability and predictive power.* The markedly lower reliability for measures of errors calls into question the practice of giving more than negligible weight to errors in evaluating straight copy performance — especially at low levels of skill. The low reliability of

[4]The importance of scoring for speed is dramatically supported by the considerable range of speed scores for the job-type activities of which the scores mentioned in Footnote [1] are a sample. On all subtests in all classes both speed and quality scores were equally wide-ranging. One interesting and inevitable phenomenon rsulting from using speed as one criterion of performance is that greater heterogenity results — scores for both speed and quality are strung out over a wider range; differences among students are maximized — thus producing the discrimination which is one of the hallmarks of a good test.

error scores, it may be added, is another reflection of the great complexity of the factors that have to do with straight copy accuracy and suggests, as well, that practically everything we have at present by way of accuracy-development materials and procedures is of doubtful value (West, 1957a).

RELATIONSHIPS BETWEEN STRAIGHT COPY SCORES AND SPEED ON JOB-TYPE ACTIVITIES

The relevant data are presented in the conventional format of a matrix of intercorrelations, as shown in Table 1. The variables are numbered for ease of reference, and the correlations are identified by subscript in the discussion which follows. For example, r_{12} represents the correlation between variable 1 (gross wpm) and variable 2 (number of errors), and its value may be found in the cell in which row 1 intersects with column 2; namely, $r_{12} = -.27$. This shows that as speed in straight copy work goes up, number of errors goes down; the faster typists are more accurate — but to an negligible extent. Since $r^2 = .0729$, only 7 per cent of the factors accounting for speed of typing are also those that make for accurate stroking.

Table 1

INTERCORRELATIONS BETWEEN STRAIGHT COPY SCORES AND SPEED SCORES ON VARIOUS JOB-TYPE ACTIVITIES

(Decimal Points Omitted; N = 66)[1]

	Straight Copy		Job-Type Activities				
	2	3	4	5	6	7	8
Straight Copy	No. of Errors	Net wpm	Simple Corr.	Tabulation	Manuscript	Rough Draft	Letter with Tab.
1. Gross wpm	-27	88	46	39	56	42	55
2. No. of Err.		-65	-36	-05	-22	-34	-30
3. Net wpm			57	36	56	57	55
Job Activities							
4. Simple Correspondence				50	57	43	38
5. Tabulation					17	34	41
6. Manuscript						37	56
7. Rough Draft							41

[1]All the correlations of .24 or higher are significantly different from zero at the 5 per cent level.

The data of Table 1 may be divided for convenience into three different sections. The three correlations in the upper left-hand corner of the body of the table are internal to straight copy work. The fifteen correlations to the right of these show straight copy scores as against speed on various job-type activities. The ten entries in the lower-right hand corner of the body of the table show interrelationships in speed as between one job-type activity and another. It is the fifteen entries in the second section of the table that are of major relevance here. The r's are patently low in terms of the purpose of this investigation. In no instance does any r exceed .57 (r_{34} and r_{37}). In other words, the highest relationship produced suggests tnat only one-third of the factors that account for straight copy proficiency (as measured by net wpm) also account for speed in typing business correspondence or in completing a piece of rough draft typing ($r^2 = .57^2 = .3249 = 32$ per cent). By

training for high straight copy skill one is training for less than one-third of whatever factors enter into speed at the two job-type activities mentioned. Wrapping the job-type activities into one package (by converting the r's to z's and the average z back to an r), gross wpm correlated with the five job-type activities .48; net wpm, .53. In summary, *about a quarter of the factors that underlie straight copy proficiency are also those that bring about speed at job-type activities. Three-quarters of what it takes to be a rapid typist on job activities are not measured by straight copy scores and, by inference, are not being trained for when the training is devoted to straight copy skill.*

RELATIONSHIPS BETWEEN STRAIGHT COPY SCORES AND QUALITY SCORES ON JOB-TYPE ACTIVITIES

With all due regard to taking speed of work into account in assessing proficiency at job-type activities, quality still is of foremost importance. The data on this issue, shown in Table 2, make an even more powerful case against the assumption that straight copy skills make much of a contribution to proficiency at real job activities. In fact, for a sample of 66 persons, r must equal at least .24 before it may be inferred that in the hypothetical population of all possible typists the chances are at least 95 in 100 that there is any relationship at all between straight copy performance and quality of performance on job-type activities. Accordingly, 9 of the 15 correlations are small enough to occur by chance in more than five per cent of successive samples of 66 typists. Even the six correlations that are significantly different from zero are of a size as to be of little, if any, practical consequence. At best, none of the three measures of straight copy performance shown accounts for more than five per cent of the variability in quality scores on the real job activities. *Whatever it takes to prepare real typing tasks correctly is not being measured by straight copy skill and, again, is not being trained for when training is devoted to ordinary skill building.* The hypothesis that straight copy proficiency has, in general, no relationship at all with the *quality* of work on job-type activities can *not* be rejected on the basis of the present data.

Table 2

INTERCORRELATIONS BETWEEN STRAIGHT COPY SCORES AND QUALITY SCORES ON VARIOUS JOB-TYPE ACTIVITIES

(Decimal Points Omitted; N = 66)

	Job-Type Activities					
Straight Copy	4 Simple Correspondence	5 Tabulation	6 Manuscript	7 Rough Draft	8 Letter with Tab.	9 Mean
1. Gross wpm	10	27	15	08	34	19
2. No. of Err.	-06	-33	-12	-11	-29	-18
3. Net wpm	00	37	18	17	34	22

RELATIONSHIPS BETWEEN VARIOUS JOB-TYPE ACTIVITIES

None of the data thus far reported is particularly surprising. It should be self-evident that sheer key-stroking skill is only a small part of many real-life typing jobs. Rather more surprising, perhaps, is that typing jobs which might appear on the surface to have certain major features in common ap-

parently differ considerably. The reference here is to the ten correlations shown in the lower right-hand corner of Table 1. The rather modest relationships between speed of performance on the various job-type activities show that the differences among these activities substantially exceed their similarities. On the average, only about a quarter of the factors having to do with speed of performance are common to all five activities. *Speed at one sort of activity does not appear to have much in common with speed at any other.* It is apparent that each of the activities listed should be subject to specific treatment during training.

SPEED-QUALITY RELATIONSHIPS FOR VARIOUS JOB-TYPE ACTIVITIES

Even at the terminal stages of training represented by the subjects of this investigation, there is no very impressive tendency for the faster workers to do work of better quality. As shown in Table 3, speed and quality are only moderately related.

In Table 3, the very low r of .21 for the rough draft typing is especially revealing. In this subtest there were several errors in the original copy (not simple spelling errors, but errors in form, style, etc.) which students had to locate for themselves. Presumably, many students blindly copied what they saw and inevitably finished earlier than some of those who took the time, either before or during the typing, to locate the parts of the copy requiring modification. In other words, for an easier test problem, the correlation would probably be somewhat higher.

Table 3
CORRELATION BETWEEN SPEED AND QUALITY SCORES ON VARIOUS JOB-TYPE ACTIVITIES
(Decimal Points Omitted; N = 66)

Activity	r
Simple Correspondence	46
Tabulation	35
Manuscript	32
Rough Draft	21
Letter with Tabulation	57

DISCUSSION

Several questions inevitably arise in connection with the generalizability of the data here presented — all, in the last analysis, questions of sampling. Are the 66 students in this investigation representative of any definable population of typing students? Is the single instructor a representative sample of all typing instructors? Is the selection of test items a representative sample of all possible test items? This investigation does not pretend to be more than a preliminary skirmish with an important problem.[5] Still, there are

[5] For example, although the present investigation is aimed at estimating the validity of straight copy proficiency as a predictor of performance on job-type activities, no typing research has ever been done on indices of difficulty for job-type activities. We have substantial compilations of data on indices of straight copy difficulty (e.g., syllabic intensity, per cent of frequently used words, etc.), but no means at all of assessing the relative difficulty of job-type activities. Accordingly, this investigation is forced to use such grossly descriptive (and subjective) terms as "typical difficulty," "fairly difficult," and similar phrases. For a second thing, although data on the reliability of straight copy scores are presented, this investigation has no data on the precision of scores on the five job-type activities employed. We already know that two or three minutes of straight copy work furnish a measure of gross speed little subject to change when longer tests are used. Probably, the 30 minutes of business correspondence used here are also adequate; whereas the more complex activities (e.g., table, manuscript, etc.) might be more sensitive to differences in test length. In any event, inquiries into the reliability of measures of performance on job-type activities and into possible indices of difficulty of job-type activities in typewriting constitute fruitful (and vastly important) topics for future investigation.

several indications that — although the actual values for the r's could differ markedly for different test items, and could differ somewhat for different students, and possibly for different instructors — it is most unlikely that the major implications of the present findings would be changed in any material respect. The reasoning in support of these contentions follows.

SAMPLING OF STUDENTS

The range of straight copy speeds mentioned earlier (39 to 76 gwpm) appears to be quite comparable to that which would be encountered at similar levels of training elsewhere. In other words, a characteristic range of typing speeds suggests a representative sample of typing students. To put it another way, performance scores rather than persons define the sample.

SAMPLING OF INSTRUCTORS

If one will understand a sampling of instructors to mean at bottom a sampling of instructional materials and techniques, then it may be shown that the behavior of the particular instructor here involved was such as to maximize the correlations. In this investigation, virtually all class time was devoted to practice at job-type activities. Crawford has such a condition represented in the experimental classes in his recent investigation, together with control classes representing most of the practice devoted to straight skill building. Now, one of the general findings about learning is that in complex tasks practice increases individual differences. Increase in individual differences means increase in range of scores, which means increase in correlations. We should expect, then, correlations to be higher for Crawford's experimental classes than for his control classes. This is indeed the case,[6] and the Crawford data furnish direct support for the likelihood that the relationships between straight copy performance and performance on job-type activities reported here would be lowered only by spending less rather than more practice time at job-type activities. In other words, although only one instructor was involved in the present data, it is unlikely that the content of instruction resulted in underestimating the correlations.

SAMPLING OF TEST CONTENT

The correlations between straight copy performance and the various job-type activities (see Tables 1 and 2) and those between the various job-type activities (lower right section of Table 1) fall within a fairly narrow range. This suggests that a wider sampling of types of test items *of comparable difficulty* would probably not affect the correlations materially. It is not the type of test item (as described by such labels as: table, invoice, rough draft, memo, etc.) that appears to be important, but rather the difficulty of the item. For example the correlation for speed in completing a very easy table and a very difficult table was found (on a previous testing occasion) to be —.03. The correlations computed for the Crawford data (see Footnote 6) are rather higher than those of the present investigation. This is in part because the two investigations are not measuring quite the same thing in the same way (separate measures of speed and quality versus quantity of ac-

[6] I computed from tables of raw scores in the appendix to Crawford's dissertation rank-order correlation coefficients between net wpm scores on straight copy tests at the end of training and scores on his "production" test at the end of training. The correlations were .28 and .47 for the two classes which spent one-third of their time at production work (N = 59) and ranged from .55 to .88 for the four classes which spent all their time at production work (N = 117). (While rank-order correlations are not the same as product-moment correlations, ordinarily the resulting values are not significantly dissimilar.)

ceptable work). Mainly, however, the Crawford data show higher relationships between straight copy skill as measured by net wpm and performance on job-type activities than does the present investigation because the Crawford test items were substantially less difficult than those used here. There is not much risk in making the generalization that straight copy skill will make a greater contribution to job-type activities involving simple problems in form and arrangement than it will to activities where problems in form and arrangement are more formidable (and where errors of a non-trivial type not marked in the test copy have to be identified and corrected by the typist).

CONCLUSIONS

This investigation constitutes a demonstration of the obvious — or of what should be obvious — namely, that sheer stroking skill is only a modest component of performance on real-life, job-type activities. The correlational data of this study show that sheer stroking speed accounts for only about a quarter of the factors that make up speed on what might be described as fairly difficult real jobs. Further, none of the three measures of straight copy performance employed accounts for as much as five per cent of the factors that make up the more important feature of real-job performance, that is, quality. Third, there is neither any strong relationship between the various job-type activities nor between speed and quality on any given job-type activity. Even for a less difficult set of job tasks described (Crawford study) as being "typical" only about half of the factors that govern amount of acceptable production work are accounted for by straight copy proficiency (as measured by net wpm) — and this is when *all* training is devoted to production work. The contribution of sheer stroking skill is markedly lower when less training time is devoted to production work.

The implications are plain: if you want to train for jobs, then spend class time on job-type activities. Don't devote large amounts of training time in later stages to building straight copy skill with the expectation that it will contribute materially to job performance. Further, if you give more than negligible weight to straight copy tests at terminal stages of training, then you are evaluating your students on a basis that appears to have precious little to do with performance on real jobs. Still further, with respect to straight copy tests at any stage of training, error scores are so unstable and early errors so poor a predictor of later errors that grading such tests on any basis which penalizes errors heavily or which sets error maximums is to fly in the face of the evidence. That Civil Service and other employment tests for typists usually include straight copy typing may be in part the fault of typing teachers. In part, also, large-scale employers like the Civil Service Commission simply cannot afford the time and expense of scoring performances more complex than straight copy work. In any event, we need to get busy re-educating these employing agencies. Last, don't lose sight of the fact that while quality is of foremost importance, the fast worker is preferred to the slow one; no evaluation of performance should ignore speed of work.

The findings of this investigation relate to the presumed tendency on the part of teachers (and reflected by the content of typing textbooks) to carry

surprising amounts of straight copy practice into *later* stages of training. It is the too-long-continued and excessive straight skill building that is objectionable. It is well known empirically as well as deeply embedded in psychological principles that one cannot ask the student to attend to problems of form and arrangement when his level of stroking skill is such that most of his attention needs to be devoted to key stroking — at which key stroking *per se* is still a somewhat arduous task. The writer's personal practice — for whatever guidance it may afford — is to defer job-type activities until about 20-25 *gross* wpm speeds are achieved (Week 5 or 6). Thereafter, the proportion of class time devoted to straight copy work decreases at an accelerating rate.

In the light of the findings of this investigation as well as in view of the logical and psychological absurdity of expecting good performance on task ABC when practice has been mainly devoted to component A — the least important of the components (as when straight copy practice is expected to contribute materially to performance on job-type activities) — it may be suggested that not less than the final three months of a 1-year course be devoted almost entirely to job-type activities; likewise, for most of the final year of a 2-year course.

SUMMARY

A battery of typing tests was administered to 66 college students at terminal stages of training. Straight copy scores were found to correlate very moderately with speed on each of five job-type activities and negligibly with quality on these activities. Accordingly, it appears desirable to spend large amounts of training time, once past the earlier stages of training, mainly on job-type activities rather than on continual building of greater straight copy skill.

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Cooperative Office Training in the U.S.: Some Significant Facts[1]

This study of the status of cooperative office training was made in 1956 for the purpose of presenting information to a national meeting of the state directors of vocational education and stimulating long-range state planning in the area of office occupations.

Release of the data at this time seems pertinent in view of the establishment in 1959 of a position of specialist in office occupations in the U. S. Office of Education. However, there are other significant reasons for looking at the status of cooperative office training. One deals with the changing complex of office occupations. As more office positions require machine training of one kind or another, the office educator may find it quite necessary to make the community his classroom — the cooperative method utilizes the equipment and facilities of the office. It may be true also that clerical training will be needed for far greater numbers tomorrow than today. And, it may be argued that while principles and basic skills can be taught in school, the patterns of competence must be developed in the real-job climate of the office — the laboratory of cooperative education. Further, there appears to be coming a significant expansion of education beyond the high school.

It should be noted, however, that this study does not provide any real evidence of the need for cooperative education in the curricula of the future. It is presented only in the context of the time for change — it represents what was, not what necessarily ought to be.

PROCEDURES

A questionnaire was sent to the state directors of vocational education in each of the states, the four territories, and the District of Columbia. Of the 53 instruments mailed, 51 were returned. Many directors also sent letters indicating a high level of interest in cooperative office training and detailing their future plans.

RESULTS AND DISCUSSION

The findings of the study relate to three general interests: (1) the status of present state leadership roles and fiscal responsibilities, (2) enrollments, and (3) teacher-education efforts.

ROLE OF THE STATE IN LEADERSHIP AND FISCAL AID

State staff positions have long been established to provide leadership and consultative aid to schools in carrying out programs in agricultural, homemaking, industrial, and distributive occupations. To what extent is similar leadership given to office occupations education using the cooperative method? Table 1 provides a clear-cut answer. More than half (27 of the 51

[1]Summarized from a study made by the research services of the Office of Vocational Education, Michigan Department of Public Instruction, 1956 with the aid of the authors.

TABLE 1

SUPERVISORY POSITIONS IN TWENTY-SEVEN STATE OFFICES OF VOCATIONAL EDUCATION PROVIDING LEADERSHIP TO COOPERATIVE OFFICE TRAINING IN 1955-56

Business Education — 18 states:
(Office and Distributive)

Arizona	Idaho	Nevada - X
California	Illinois	New York
Delaware	Iowa	North Dakota - X
Dist. of Col. - X	Kansas - X	Pennsylvania
Florida - X	Michigan - X	Puerto Rico - X
Hawaii - X	Minnesota - X	Wyoming

Business Education — 4 states:
(Office only)

Georgia - X	Pennsylvania - X
Florida - X	Virginia - X

Distributive Education — 4 states:

Colorado	New Mexico
New Jersey	Wisconsin

Trade and Industrial — 2 states:

Alabama - X	Tennessee

State Director — 1 state:

Maryland

X = states reimbursing cooperative office training

responding) of the states and territories provide leadership to cooperative office training through state vocational education advisory staff.[2] (In some cases leadership is nominal due to the limitations or available staff personnel who also supervise other programs.) The great majority of supervisory positions are in the Business Education Service, usually combining efforts in both office and distributive occupations. Some professional personnel are convinced that combining office and distributive supervisory staff under one service enhances the value of the over-all consultative aid to local schools and brings about a balanced program.

A further question of state leadership resides in the existence of legislative authority permitting the use of state and federal funds for reimbursing local programs. At the present time there is no congressional authorization nor appropriation for federal fiscal involvement in cooperative office training in the states and territories. However, as Table 2 indicates, *nineteen* states and territories had in 1955-56 legislative authority to use state vocational funds to reimburse local cooperative office training programs. Of this number, *thirteen* actually reimbursed local schools while *eight* reported enrollments but did not use state funds to reimburse such programs.

State funds (see Table 3) so used amounted to $482,600 which with local expenditures of $519,740, totals over a million dollars spent on cooperative office training in 1955-56. State funds in 1955-56 were 13.6% above the previous year and 63.7% above 1953-54. Local expenditures were almost double that of 1953-43. These figures evidence substantial fiscal support of the cooperative method of educating office workers. Further, the dramatic increases imply a felt need for cooperative office training, especially in view of the fact that federal funds for office occupations (under Trade and Industrial Education) were discontinued in 1952.

[2] It should be noted that, of the 27 states providing state leadership in cooperative office training, 20 reported enrollments in 1955-56.

TABLE 2
STATE LEGISLATIVE AUTHORITY PERMITTING REIMBURSEMENT OF COOPERATIVE OFFICE TRAINING FROM STATE FUNDS[1]

States Having Legislative Authority (19)		*States Not Having Permissive Legislation (28)*		
Alabama - X	Nevada - X	Arizona	Oregon	Rhode Island
Alaska	New Hampshire	California - Z	Pennsylvania	South Carolina
Dist. of Col. - X	North Carolina	Colorado - Z	Maine	Tennessee - Z
Florida - X	North Dakota - X	Connecticut	Massachusetts	Texas
Georgia - X	Ohio	Delaware - Z	Mississippi	Utah
Hawaii - X	Puerto Rico - X	Idaho	Missouri	Vermont
Kansas - X	Virginia - X	Illinois	Nebraska	Washington
Maryland	West Virginia - X	Indiana	New Jersey - Z	Wyoming - Z
Michigan - X	Wisconsin	Iowa	New Mexico - Z	
Minnesota - X		Kentucky	New York - Z	

X = used state funds in 1955-56 Z = state supervision but not reimbursement

[1] Four states did not respond.

TABLE 3
ENROLLMENTS AND EXPENDITURES FOR COOPERATIVE OFFICE TRAINING IN 1955-56

	Enrollments	*Schools*	*Expenditures State*	*Local*
Alabama	82	3	$ 15,360	$ 0
California	1,123	48	z	NA
Colorado	NA	3	z	NA
Delaware	288	7	z	NA
Florida	55	2	7,424	1,061
Georgia	3,335	23	85,000	28,000
Hawaii	73	4	16,887*	0
Kansas	202	12	16,074	22,102
Michigan	4,237	111	125,865	250,918
Minnesota	402	16	36,143	36,143
Nevada	40	3	500	3,500
New Jersey	600	17	z	NA
New Mexico	35	2	z	NA
New York	3,191	52	z	NA
North Dakota	349	13	120	10,959
Puerto Rico	1,660	22	61,776*	0
Tennessee	160	8	z	NA
Virginia	740	38	100,569	94,392
West Virginia	29	1	2,182	2,668
Wyoming	179	9	z	NA
District of Columbia	58	6	14,600*	0
	16,838	400	$482,600	$519,473

* = federal territorial funds

z = state supervision and consultation but no state funds used

NA = data not available

Ten of the states reimbursing local programs did so as a percentage of salaries and travel of local personnel (coordinators and related subjects teachers), one state reimbursed a percentage of salaries only, one state a flat amount per coordinator, and one on a formula basis.

ENROLLMENTS IN COOPERATIVE OFFICE TRAINING

As Table 3 shows, the 1955-56 enrollments were 16,838 in cooperative office training programs meeting standards comparable to those in the cooperative distributive education and trade and industrial programs.[3] Of this total, 11,262 enrollments were in programs reimbursed from state funds.

Only three of the states reimbursing office programs were among the fourteen top-ranking states in trade and industrial and D. E. cooperative enrollments — states well-conditioned to cooperative training techniques whose enrollments were 68% of the total national enrollments. The implication is clear. If all states and territories were to offer cooperative office training programs with federal leadership, reimbursed funds, and accompanying state consultative services, a potential enrollment of 50,000 office trainees seems realistic.

Another facet of the enrollment picture is worth mention. In 1955-56 the 397 schools offering cooperative office training averaged 42 students per program. These trainees spent the equivalent of a half-day in a training station. When the community becomes a classroom, needed school classroom facilities are freed at a time when space is at a premium in many schools.

THE STATUS OF TEACHER EDUCATION

Six of the states providing reimbursement also designated teacher-education for the in-service and pre-service preparation of office occupations teacher-coordinators. All together eight institutions were designated, five receiving reimbursement for teacher-education activities, three serving without fiscal aid. In four institutions the teacher-educators served office education only, in three office and distributive teacher-education were combined;

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[3]While figures are unavailable, there is some evidence that a great many local schools operate some form of work-study programs in office occupations. Often, such programs are of less than one year in length, may involve only a few hours of work per week, and may be supervised only to a limited degree. There is educational value in such programs but they are not comparable to the programs described in this article.

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